03)

$P = 8KN$

$T_{ADM} = 42MPa$

$\theta_{BC} = 45°$

$a = b = c = 1,5m$

$d = 0,6m$

$\curvearrowleft + \Sigma M_D = 0 \Rightarrow F_{BC} \cdot \sin(45) \cdot 1,5 - B(1,5+0,6) = 0$

$F_{BC} = \frac{1,5+0,6}{\sin(45) \cdot 1,5} \therefore \boxed{F_{BC} = 15,839KN}$

$\curvearrowright + \Sigma M_A = 0 \Rightarrow D_y(1,5+1,5) - 8(1,5+0,6) = 0$

$\boxed{D_y = 5,6KN}$

$\rightarrow + \Sigma F_x = 0 \Rightarrow \boxed{A_y = 9KN}$ $\quad +\uparrow \Sigma F_y = 0 \Rightarrow \boxed{A_y = D_y = 5,6KN}$

* Cálculo de 'd' do pino A (Cisalhamento duplo):

$F_A = \sqrt{8^2 + 5,6^2} = 9,77KN \qquad V_A = \frac{F_A}{2} = \frac{9,77}{2} \therefore V_A = 4,885$

$d = \sqrt{\frac{4}{\pi}\left(\frac{0,5 F_A}{T_{ADM}}\right)} = \sqrt{\frac{4}{\pi} \cdot \left(\frac{0,5 \cdot 0,77 \times 10^3}{42 \times 10^6}\right)} \Rightarrow \boxed{d = 12,166mm}$

* Cálculo de d em B (Simples):

$F_B = 15,839KN = V_B$

$d = \sqrt{\frac{4}{\pi}\left(\frac{F_B}{T_{ADM}}\right)} = \sqrt{\frac{4}{\pi}\left(\frac{15,839 \times 10^3}{42 \times 10^6}\right)} \therefore \boxed{d = 21,913mm}$

04)

$M = 3000kg$

$h = 2m$

$r = 1m$

$\theta = 60°$; $\alpha = 120°$

$W = 29,43KN$

(I) Eq.ºs de Equilíbrio:

$\Sigma M_x = 0 \Rightarrow 2F \cdot (r \cdot \cos\theta) - F_{AD} \cdot r = 0 \therefore \boxed{F_{AD} = F}$

$\Sigma F_z = 0 \Rightarrow 3F \cdot \theta - W = 0 \Rightarrow F = \frac{29,43}{3 \cdot 0,8944} = \boxed{10,97KN}$

(II) Tensões Normais Médias:

• Cabos BD e CD:

$\sigma_{BD} = \sigma_{CD} = \frac{10,97 \times 10^3}{\frac{\pi}{4}(0,010)^2} = 139,65MPa$

• Cabo AD:

$\sigma_{AD} = \frac{10,97 \times 10^3}{\frac{\pi}{4}(0,007)^2} \therefore \boxed{\sigma_{AD} = 285MPa}$

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